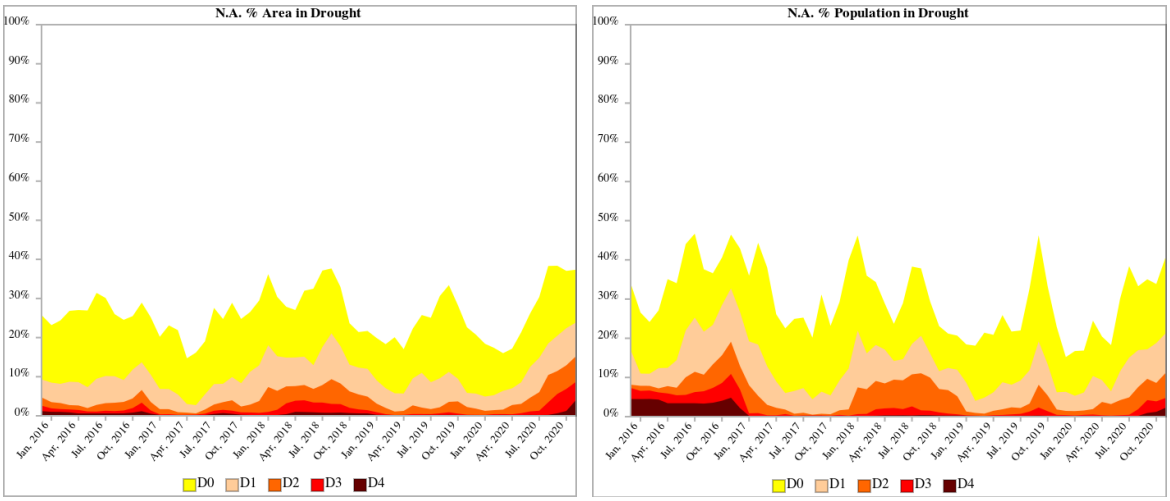
# North American Drought Monitor – November 2020

At the end of November 2020, moderate to exceptional drought (D1-D4) affected 23.7% of the area and 21.1% of the population of North America. The percent area value was 1.4% more than the value for the end of October 2020. The percent population value was 2.4% more than the value for the end of October. At the end of November, 91.9% of the Rio Grande/Bravo River Basin and 60.0% of the Great Plains were in moderate to exceptional drought, 30.0% of the Columbia River Basin was in moderate to extreme drought (D1-D3), and 5.5% of the Great Lakes Basin was in moderate drought. The North American Great Plains extends across the United States and into adjacent parts of northeast Mexico and the southern Prairies of Canada. The percent area values for the Great Lakes and Rio Grande/Bravo River Basins and Great Plains increased this month, while the value for the Columbia River basin decreased compared to the end of October.




**CANADA:** The picture of drought across Canada changed only minimally in the month of November. Much of any remaining drought across B.C. was removed, and many parts of Alberta and western Saskatchewan saw improvements from adequate November moisture. Drought Conditions remained in the eastern Prairies due to both long-term and short-term precipitation deficits. The eastern Prairies went into freeze up with below normal soil moisture and had received minimal snow as of the end of November. Central Canada saw the degradation of conditions and expansions of Moderate Drought (D1) and Abnormally Dry (D0) conditions in Ontario while there were some improvements in northern Quebec and on the Gaspé Peninsula. Although Atlantic Canada continued to experience significant dry conditions, there were slight improvements in the last month. Northern Canada experienced below-average precipitation, with the development of a small Moderate Drought (D1) area. Approximately fifteen percent of the country was considered Abnormally Dry (D0) or in drought; this includes nearly forty percent of the agricultural landscape.

**Pacific (BC):** British Columbia received adequate precipitation in the month of November which led to further reduction in Abnormally Dry (D0) conditions overall. Previously-reported pockets of Abnormally Dry (D0) conditions around Fort Nelson and on Haida Gwaii

were removed as these areas received near- to above-normal precipitation amounts this month. Additionally, streamflow in these regions also reported High to Very High values, indicating adequate moisture levels. Between 115 – 150 percent above-normal precipitation was received over the last two months in the Okanagan region and as a result, the Abnormally Dry (D0) conditions were removed in this area as well. Although much of the province saw improvement in moisture levels, the southeastern corner continued to have precipitation deficits. Within the past three months, the region from Golden to Canal Flats and towards the Rocky Mountains received 50 – 75 mm below-normal precipitation. In the same timeframe, however, a stretch from Grand Forks to Cranbrook and Fernie saw near-normal precipitation. As a result, the Severe Drought (D2) classification was removed along the B.C.-Alberta border, but the Moderate Drought (D1) and Abnormally Dry (D0) conditions remained in place. Only four percent of the province was classified as Abnormally Dry (D0) or Moderate Drought (D1), down six percent compared to last month; this includes approximately eight percent of the agricultural landscape.

**Prairies (AB, SK, MB):** Drought conditions across the Prairies followed an east-west division in the month of November, where much of Alberta and western Saskatchewan received ample precipitation but eastern Saskatchewan and much of southern Manitoba continued to miss out on much-needed moisture. In Alberta, the extent of Abnormally Dry (D0) conditions was reduced significantly barring a few pockets that remained near Edmonton, Vegreville and in the foothills west of Calgary. These dry areas remained in place as they received precipitation below the 40th percentile in the last 90 days. The Standardized Precipitation Evapotranspiration Index (SPEI) indicated lingering dryness still remained around the foothills of Calgary and an area west of Edmonton over the past three months, but recent snowfall helped to alleviate these concerns, leading to a one-class drought improvement in these areas. As such, the Moderate Drought (D1) remained from Banff to High River, but the Severe Drought (D2) in this area and the D1 pocket near Edmonton were removed. The greatest precipitation amounts this month were seen across parts of western and central Saskatchewan, where they received more than 200 percent above-normal precipitation. This moisture led to a reduction in Abnormally Dry (D0) and Moderate Drought (D1) conditions from the southwest corner towards North Battleford. However, minimal improvement occurred east of Moose Jaw, where Moderate Drought (D1) and Severe Drought (D2) persisted given a lack of moisture over the last year. Moderate Drought (D1) now extends from Mortlach, Saskatchewan, through Manitoba and into northwestern Ontario. Severe Drought (D2) remained relatively the same, spanning from Regina, to as far north as Swan Lake, MB and as far east as Winnipeg; this area received less than 60 percent of normal precipitation in the last three months. The northern Prairies remained untouched by drought as streamflow trended above-normal and the region received plenty of precipitation over the previous three months. Nearly twenty-three percent of the Prairie region was classified as either Abnormally Dry (D0), in Moderate Drought (D1) or in Severe Drought (D2); this includes forty-eight percent of the region's agricultural landscape.

**Central (ON, QC):** The central region experienced minimal change in November, barring a few areas in northwestern and southern Ontario. Streamflow levels degraded in the northwest region this month; because of this, in addition to only 50 percent of normal precipitation falling in the last 3 months, Moderate Drought (D1) formed once again around Lake of the Woods towards Thunder Bay. Abnormally Dry (D0) conditions were also

expanded slightly in the area. In southern Ontario, pockets of Abnormally Dry (D0) conditions formed from Windsor to Sarnia and expanded slightly to stretch from Woodstock to Newburgh. These areas received 50 mm less than normal precipitation since October, equating to approximately 25 percent below-normal. This also extended towards Niagara Falls, where a small pocket of Moderate Drought (D1) remained. In addition to these areas, small pockets of D0 developed around Petawawa and Brockville to Cornwall given low precipitation in the last 30 days. Although conditions in southern Quebec didn't drastically change in November with near-normal precipitation, much of the previously reported drought remained in place; this includes an area of Abnormally Dry (D0) conditions stretching from Granby to St-Georges and a persisting Moderate Drought (D1) pocket south of Sherbrooke. This area currently holds a precipitation deficit of 220-325 mm in the past year, resulting in minimal improvement even with near-normal precipitation. Conditions on the Gaspé Peninsula, however, have improved greatly given 115-150 percent of normal precipitation falling over the last two months. Eight percent of the Central region remains in either Abnormally Dry (D0) or in Moderate Drought (D1); this includes twenty-three percent of the agricultural landscape.

**Atlantic (NB, NS, PEI, NL):** Moisture deficits continued to improve slightly in the Atlantic region, but much of the abnormally dry conditions remained in place. Significant rainfall across the Gaspé Peninsula reached into northwestern New Brunswick, which helped to alleviate any previous concern of drought. Not only did 100-125 mm of precipitation fall in this area over the past thirty days, but satellite-derived data indicated that all three levels of soil moisture (Surface-level, Root Zone and Groundwater) contained adequate moisture. Small improvements were made in central New Brunswick towards Nova Scotia, but the majority of the previously-defined drought areas remained. Less than 50 mm of precipitation fell across this region in November, even much less so across P.E.I. at only 15 mm or less. As a result, Moderate Drought (D1) lingered across all of P.E.I and southern New Brunswick, from Pointe-Sapin to Forest City. This also included parts of northern Nova Scotia from Amherst to Antigonish, as well as an ever-persisting pocket in the Annapolis Valley. Many of these areas are highlighted in the SPEI as fairly dry in both short-term and longer-term time frames. Abnormally Dry (D0) conditions expanded in Newfoundland from as far south as Granite Lake to Twillingate as satellite-derived data shows dryness in this area in the last three months. Almost twenty-eight percent of the Atlantic region is classified as Abnormally Dry (D0) or in Moderate Drought (D1); this includes nearly eighty-one percent of the region's agricultural landscape.

**Northern (YT, NWT):** Conditions in the Northern region of Canada worsened in the month of November. A small pocket of Moderate Drought (D1) developed around Old Crow, as only 31.6 percent of normal precipitation fell since September, ranking it at its 3rd driest Autumn since record keeping began in the area. In addition, satellite-derived data reported this area stretching south along the Yukon-N.W.T. border and towards Great Bear Lake as receiving only 50 percent of normal precipitation since September; this led to the expansion of Abnormally Dry (D0) conditions. A small stretch of Abnormally Dry (D0) conditions was also added from the Yukon-U.S.A. border towards Burwash Landing, given that this station reported only 31.2 percent of normal precipitation, equal to its 2nd driest Autumn on record. The remainder of the Northern region was unaffected by drought. Approximately fifteen

percent of the Northern region is classified as Abnormally Dry (D0) or in Moderate Drought (D1).

**UNITED STATES:** Fueled by record-setting warmth during the first half of the month, November temperatures averaged more than 5°F (3°C) above normal in many locations from the Plains to the Atlantic Coast. In contrast, near-normal monthly temperatures prevailed in the West, where warm and cool periods were interspersed. Western wildfire activity waned in November, although year-to-date U.S. fires have charred about 9.5 million acres (more than 3.8 million hectares) of vegetation—more than 140 percent of the 10-year average). Meanwhile, significantly drier-than-normal November weather covered several areas, including portions of the Plains and large sections of California, the Southwest, and the northern Mississippi Delta. By November 29, dry conditions across the central and southern Plains left more than one-fifth of the winter wheat rated in very poor to poor condition in Colorado (38 percent), Texas (34 percent), Nebraska (26 percent), and Kansas (22 percent). However, the Plains' dryness also favored fieldwork, including harvest efforts. The U.S. sorghum harvest was 97 percent complete by November 22; the sunflower harvest was 97 percent complete a week later, on November 29. Farther east, however, periods of heavy rain—including the interaction between Tropical Storm Eta and a cold front—hampered harvest activities for a variety of summer crops, including cotton and soybeans. By November 29, more than one-fifth of the cotton remained in the field in Virginia (62 percent harvested), North Carolina (74 percent), and South Carolina (77 percent). Tropical Storm Eta, the record-shattering twelfth Atlantic tropical cyclone to make a U.S. landfall this year, twice struck Florida. Aside from gusty winds, Eta's primary impact was flash flooding from heavy rain. Eta produced 6 to 18 inches (150 to 450 mm) of rain in southeastern Florida. Elsewhere, an already expansive U.S. drought further intensified, especially from the Southwest to the High Plains. By November 24, drought covered 75.6 percent of the 11-state Western region and 48.6 percent of the Lower 48 States, according to the U.S. Drought Monitor. National drought coverage was the highest in more than 7 years, since September 2013. Despite the national picture, drought coverage decreased during November in several regions, including the Northeast.

According to preliminary data provided by the National Centers for Environmental Information, the contiguous U.S. experienced its 4th-warmest, 33rd-driest November during the 126-year period of record. The nation's monthly average temperature of 46.4°F (8.0°C) was 4.7°F (2.6°C) above the 20th century mean, while precipitation averaged 1.90 inches (48 mm)—85 percent of normal. Temperatures in all Lower 48 States were on the warm side of the historical distribution. Idaho, with its 57th warmest November, was the "coolest" state. Top-ten rankings for November warmth were noted in 31 states—Alabama, West Virginia, three Southwestern States, five Plains States, seven Midwestern States, and all Atlantic Coast States but New Hampshire. Meanwhile, statewide precipitation rankings ranged from the 11th-driest November in North Dakota to the eighth wettest in Delaware. Behind Delaware were North Carolina (10th-wettest November), Virginia (11th wettest), and Florida (12th wettest).

**Northeast:** Drought coverage in the Northeast fell to 21.1 percent by December 1, down from 37.1 percent at the beginning of November and down from an October peak of 50.1

percent. Nevertheless, a small patch of severe to extreme drought (D2 to D3) lingered by month's end across southern sections of Maine and New Hampshire. On November 29, New Hampshire led the region with topsoil moisture rated 79 percent very short to short, according to the U.S. Department of Agriculture. Outside of New England, some moderate drought (D1) remained by early December in parts of New York and Pennsylvania.

**Southeast:** By the end of November, there was no drought observed in the Southeast. However, patches of abnormal dryness (D0) dotted Alabama, Georgia, and small areas in southern South Carolina and northern Florida. Regional coverage of dryness stood at 10.6 percent by December 1, up from 3.6 percent four weeks earlier.

**South:** Only patchy dryness (D0) and moderate drought (D1) was noted on December 1 from the lower Mississippi Valley eastward, but rapid drought expansion and intensification ("flash drought") occurred during November in Texas. By December 1, drought covered 79.4 percent of Texas, up from 45.5 percent on November 3. Texas was one of seven states experiencing exceptional drought (D4), with coverage reaching 13.0 percent by early December. At the end of November, more than one-third (34 percent) of the Texas winter wheat crop was rated in very poor to poor condition.

**Midwest:** Drought coverage in the Midwest decreased slightly, from 10.3 to 9.1 percent, during the 4-week period ending December 1. Much of the Midwestern drought was confined to the western portion of the region, with a pocket of extreme drought (D3) lingering across northwestern Iowa.

**High Plains:** By December 1, drought covered 80.7 percent of the six-state High Plains region, up from 72.3 percent in early November. Winter wheat was struggling due to drought in some areas, with 38 percent of the crop in Colorado rated in very poor to poor condition, according to the U.S. Department of Agriculture, on November 29. On the same date, topsoil moisture was rated at least one-half very short to short in each of the region's states, ranging from 51 percent in Kansas to 83 percent in Colorado. Exceptional drought was present by early December in parts of Colorado (26.7 percent coverage) and Wyoming (0.4 percent).

**West:** The 6-month period from June-November 2020 was the hottest and driest on record in Arizona, California, and Nevada. New Mexico had its hottest, 2nd-driest such period, with only June-November 1956 being drier. For Utah, it was the 3rd-hottest, driest such period, with only June-November 2012 and 2016 being hotter. The combination of Western heat and dryness has depleted soil moisture and severely stressed rangeland and pastures. On November 29, topsoil moisture was rated at least three-quarter very short to short in Colorado (83 percent), New Mexico (82 percent), Utah (81 percent), and California (75 percent). During the 4-week period ending December 1, regional drought coverage decreased slightly from 77.9 to 75.6 percent, on the strength of Northwestern precipitation. However, November was another dry month in the Southwest, allowing coverage of exceptional drought (D4) to expand to 76.8 percent by December 1 in Arizona; 68.6 percent in Utah; 53.3 percent in New Mexico; 26.7 percent in Colorado; and 21.2 percent in Nevada. Water shortages have become more acute in parts of the Southwest, with statewide reservoir storage in New Mexico standing at well under one-half of normal during November.

**Alaska, Hawaii, and Puerto Rico:** November storminess eliminated a small area of moderate drought (D1), in northwestern Alaska, but abnormal dryness (D0) still covered 11.1 percent of the state by December 1. In Hawaii, warm but showery weather reduced drought coverage from 71.8 to 22.6 percent during the 4-week period ending December 1. In Puerto Rico, there was a net decrease in coverage of abnormal dryness (D0) from 10.1 to 8.3 percent between November 3 and December 1.

**MEXICO:** The weather conditions in November were quite variable: dry and warm weather was experienced across the country, from northern to central zones, with humid and slightly cooler conditions in the states of the Gulf of Mexico and the Yucatan Peninsula. With the end of summer weather systems, only one tropical wave approached the national coasts. The prominent meteorological systems observed this month included seven frontal passages (two more than the November average) and two winter storms. Rains resulting from these meteorological phenomena were concentrated in southern Veracruz, Tabasco, northern Chiapas and portions of the Yucatan Peninsula, leaving the rest of the Gulf of Mexico slope with below-average rainfall. It is in this context that dry and drought conditions continued to worsen in most of the country, while only the Gulf of Mexico and the Yucatan Peninsula remained free out of drought. Thus, the drought footprint from moderate to exceptional (D1-D4) had an increase of 9.26 percent over the last month, rising from 37.9 percent on October 31, to 47.16 percent on November 30. The accumulation of 33.6 mm of rain nationally was 13.6 percent above the long-term November average (1941-2019) which is 32.2 mm, ranking this as the 26th wettest November. However, most of this moisture was concentrated in southern regions of the country. In contrast, a national mean temperature of 20.4°C was 1.5°C above the average, and tied with November 2017 as the warmest November recorded since 1953. Fewer regions reported maximum daily temperatures above 40°C, which were concentrated in western parts of the country, while regions that experienced daily minimum temperature lower than 0°C were located in northern and central states.

**Northwest or North Pacific (Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit):** These states cover approximately 21 percent of the national territory. Overall, the moisture produced by winter systems was most evident in the states of Baja California and Sonora between November and March, while the rest received moisture from the Pacific, mainly from the jet stream. In November 2020, low precipitation received in Baja California, Sonora and northern Sinaloa meant the rest of the region continued to be affected with moderate to exceptional drought (D1–D4) with short and long-term impacts. The state most drought-affected is Sonora, which recorded their driest period from September to November, and has 1.8 percent area in exceptional drought (D4), 35.2 percent in extreme drought (D3), 55.5 percent in severe drought (D2) and 7.4 percent in moderate drought (D1) at the end of November. Altogether, 99.9 percent of its territory is in drought from D1 to D4. The second most drought-affected state is Sinaloa with 67.8 percent area in severe drought (D2) and 32.2 percent in moderate drought (D1). The Baja California Peninsula and Nayarit have lower area percentages in drought, although Nayarit had its driest November on record. Sonora and Chihuahua also had their second warmest November on record.

**Northern (Chihuahua, Coahuila, Durango, Zacatecas and San Luis Potosí):** These states comprise of 33.4 percent of the country's land area. Only Coahuila received rainfall in

central-northern areas, while the rest of states received less than 25 percent of the monthly average rainfall. All of the northern states are in drought; Chihuahua has the most severe categories (D3 and D4) across most of its territory, while the rest of the states have at least severe drought (D2). Chihuahua recorded the eighth driest period from December 2019 to November 2020 and Coahuila had their ninth driest period in the last twelve months. Chihuahua and San Luis Potosí also recorded their second and first driest period in the last six months, from June to November. The average temperature in November in several of these states exceeded 3°C above the November average despite short periods of cooler conditions. Coahuila and San Luis Potosí reported their warmest November on record.

**Northeast (Nuevo Leon and Tamaulipas):** This region comprises 7.3 percent of the national territory. Moderate and severe drought (D1 and D2) expanded to northern Nuevo León and Tamaulipas in the last month. These states had a better summer rainy season in 2020, with the eighth and fifth wettest periods from September to November, respectively; as a result, the impacts of this drought are short-term. Environmental conditions began to dry out at the same time that temperatures increased, and both states had their warmest November on record. Drought (D1 or greater) in this region had been absent since early May 2020.

**Central-West (Aguascalientes, Jalisco, Guanajuato, Colima and Michoacan):** These states represent 9.3 percent of the national territory. Drought impacts are beginning to appear mainly in Guanajuato, Michoacán and Jalisco, where moderate and severe drought (D1 and D2) represent the greatest threat. Aguascalientes and Jalisco had their first and second driest Novembers on record, so the moderate drought (D1) increased between these two states. Minimum temperature was close to average this month, but both the maximum temperature and the average temperature were above-average, with Jalisco recording their third warmest November.

**Central-South (Queretaro, Hidalgo, State of Mexico, Tlaxcala, Puebla, Morelos and Mexico City):** This region represents 5.2 percent of the national territory. The drought expanded from Central-west to Central-south in the last month. Moderate drought (D1) covered the states of Mexico, Querétaro and Hidalgo, while the southern parts of this region remained free of drought or dryness. Rainfall was below-average this summer in the Cutzamala basins (bordering Michoacán and the State of Mexico), which proportionally supplies water to Mexico City. As a result, restrictions are expected in the winter and spring months, according to the National Committee of Large Dams (CNGP) of CONAGUA. Mexico City posted its fourth warmest November on record.

**Gulf of Mexico (Veracruz and Tabasco):** These states along the Gulf of Mexico constitute 4.8 percent of the country's land area. Portions of the northern and central Veracruz experienced dry conditions (D0) and moderate drought (D1), in contrast to the south of the state and all of Tabasco, experienced flooding in November. Two frontal systems, the first of which occurred between November 3 and 5, and the second around November 18 and 19, 2020, combined with moisture from Hurricane Iota caused severe flooding, especially in Tabasco. Reports indicated around 90,000 people were affected, 20,000 homes were damaged, in addition to losses in crops and livestock in Tabasco. Tabasco and Veracruz had their first and fourth wettest Novembers on record, respectively, so drought was not a matter of concern. Due to high storm activity, temperatures were cooler than normal.

**South Pacific (Guerrero, Oaxaca and Chiapas):** These states comprise 11.9 percent of the national territory. Guerrero and Oaxaca represent another area of drought. The state of Guerrero is the most drought-affected, and recorded their tenth driest period from December 2019 to November 2020. Extreme drought (D3) covered 3.3 percent and moderate to severe drought (D1-D2) covered 60.4 percent of the state. Rains have been deficient throughout the year; this, coupled with higher temperatures, caused conditions to worsen. Only Chiapas and eastern Oaxaca have a better moisture balance. Moisture from frontal systems reached northern Chiapas where gates to some reservoirs had to be opened as a security measure for the infrastructure; unfortunately this translated into flooding towards the plains of Tabasco.

**Yucatán Peninsula (Campeche, Quintana Roo and Yucatan):** The Yucatán Peninsula consists of 7.1 percent of the national territory. This is the other region of the country that has been drought-free for most of the year. Rain continued to fall in the region in November as a result of frontal systems from Central America due to Hurricane Iota. As a result, Quintana Roo and Yucatán reached their first and sixth wettest November. The area has been drought-free since the second half of May of this year. Despite the decrease in daily maximum temperatures due to the passage of cold fronts and rain, the average temperature was warmer than normal. Campeche reached its third warmest November, along with Quintana Roo and Yucatán recording their fourth warmest Novembers.